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“One Giant Leap [Backwards] for Mankind”¹

LIMITED LIABILITY IN PRIVATE COMMERCIAL SPACEFLIGHT

INTRODUCTION

In 2014, six people aboard Virgin Galactic’s SpaceShipTwo will likely become the first paying customers to fly on a private commercial spacecraft.² Passengers on that historic two-and-a-half hour flight³ will see “spectacular views”⁴

¹ This is an abbreviated version of Neil Armstrong’s iconic first words as he “became the first person ever to step onto another planetary body.” *Neil Armstrong: 1930–2012*, NASA (Aug. 25, 2012), http://www.nasa.gov/topics/people/features/armstrong_obit.html. Armstrong’s words in their entirety were: “That is one small step for (a) man, one giant leap for mankind.” *Id.*

² *Overview: Spaceships*, VIRGIN GALACTIC, <http://www.virgingalactic.com/overview/spaceships> (last visited Aug. 19, 2013); *Virgin Galactic Flexes SpaceShipTwo’s Unique Feather Mechanism in Second Supersonic Flight*, VIRGIN GALACTIC (May 9, 2013), <http://www.virgingalactic.com/news/item/virgin-galactic-flexes-spaceshiptwos-unique-feather-mechanism-in-second-supersonic-flight>; see Frans G. von der Dunk, *Passing the Buck to Rogers: International Liability Issues in Private Spaceflight*, 86 NEB. L. REV. 400, 403 (2007–2008). With the exception of test flights for upcoming commercial spacecraft, all prior manned spaceflight has been aboard government-owned vehicles. See MATTHEW J. KLEINMAN ET AL., *THE LAWS OF SPACEFLIGHT: A GUIDEBOOK FOR NEW SPACE LAWYERS* 39-45, 48 (2012); see also Clara Moskowitz, *Suborbital Space Ready to Take Flight, Experts Say*, SPACE.COM (June 25, 2012), <http://www.space.com/16291-suborbital-space-research-flights.html> (“While the [commercial spaceflight] companies have been conducting test flights, none have yet flown a commercial mission.”). SpaceX has the distinction of being the only company to launch a commercial spacecraft that has docked with the International Space Station, but the capsule was unmanned. Victoria Jaggard & Ker Than, *SpaceX’s Dragon Captured By Space Station—A First*, NAT’L GEOGRAPHIC (May 25, 2012), <http://news.nationalgeographic.com/news/2012/05/120525-spacex-dragon-robot-arm-international-space-station-nation>.

³ The flight will be suborbital, which is “spaceflight where the spacecraft reaches outer space, but does not have sufficient energy to complete a full revolution around the Earth before reentering the atmosphere.” KLEINMAN ET AL., *supra* note 2, at 30. While “there is no international agreement on where outer space begins,” see von der Dunk, *supra* note 2, at 424, for the limited purposes of this discussion, suborbital flight, when it exceeds the Kármán Line, a distance 100 km above sea level, will be termed as spaceflight. KLEINMAN ET AL., *supra* note 2, at 3. The Kármán Line is the “most commonly accepted demarcation between atmosphere and outer space.” *Id.*

⁴ *Overview: Experience*, VIRGIN GALACTIC, <http://www.virgingalactic.com/overview/experience> (last visited Sept. 8, 2013).

of Earth and experience six minutes of weightlessness⁵ in what promises to be a life-changing experience.⁶ In that time, the spaceflight participants will be free to unstrap from their seats and “float, tumble, even get married.”⁷ But no amount of enthrallment can prevent the inevitable corollary to the private sector’s maiden spaceflight: the first commercial spaceflight-related lawsuit.⁸

As with any lawsuit, the ultimate issue will be liability.⁹ And as with any previously unlitigated issue, the proceedings to determine liability will likely be “messy, expensive, and unpredictable.”¹⁰ Given the high costs of the initial flights,¹¹

⁵ *Virgin Galactic: Flame On*, ECONOMIST (Apr. 29, 2013), <http://www.economist.com/blogs/babbage/2013/04/virgin-galactic>; David Warmflash, *About Those Space Joyrides . . .*, AIR & SPACE MAG. (Jan. 6, 2012), available at <http://www.airspacemag.com/space-exploration/About-Those-Space-Joyrides.html>.

⁶ See *Overview: Experience*, *supra* note 4 (“[Y]ou know that life will never quite be the same again.”).

⁷ Warmflash, *supra* note 5. But some warn that permitting customers to freely maneuver in the cabin during suborbital flights could be dangerous. See, e.g., *id.* (“Unstrapping and re-strapping in such a short time frame would be a risky endeavor,” says the company’s [XCOR, a private spaceflight company] communications representative, Mike Masse.”).

⁸ See, e.g., SIMON ADEBOLA ET AL., GREAT EXPECTATIONS—AN ASSESSMENT OF THE POTENTIAL FOR SUBORBITAL TRANSPORTATION: MASTERS 2008 FINAL REPORT 105 (2008), available at http://isulibrary.isunet.edu/opac/doc_num.php?explnum_id=95 (“From an operator’s perspective, it is nearly inevitable that an accident will occur, and companies will be sued.”); Paul Bertorelli, *Space Tourism: Big Market, Big Risks*, AVWEBINSIDER (Mar. 24, 2012), http://www.avweb.com/blogs/insider/AVWebInsider_Spacetourism_206368-1.html (“Sooner or later, one of these operators will probably [suffer a catastrophic accident] and it’s more likely to happen the higher and faster you fly in untried machines.”).

⁹ The definition of liability in the context of outer space that Valérie Kayser adopted from Professor Bin Cheng’s scholarship is instructive: “[L]iability is often used specifically to denote the obligation to bear the consequences of a breach of a legal duty, in particular the obligation to make reparations for any damage caused, especially in the form of monetary payment.” VALÉRIE KAYSER, LAUNCHING SPACE OBJECTS: ISSUES OF LIABILITY AND FUTURE PROSPECTS 31 (2001) (quoting Bin Cheng, *Article VI of the 1967 Space Treaty Revisited: “International Responsibility,” “National Activities,” and “The Appropriate State”*, 26:1 J. SPACE L. 7, 9 (1998) (internal quotations omitted).

¹⁰ See, e.g., Blake Gilson, Note, *Defending Your Client’s Property Rights in Space: A Practical Guide for the Lunar Litigator*, 80 FORDHAM L. REV. 1367, 1405 (2011) (arguing that litigation regarding lunar property would be uncertain); see generally Edward A. Dauer, *Apology in the Aftermath of Injury: Colorado’s “I’m Sorry” Law*, 34 COLO. LAW. 47 (Apr. 2005) (discussing the upcoming difficulties in advance of a change in tort law); Bruce W. Foudree, *The Year 2000 Problem and the Courts*, 9 KAN. J.L. & PUB. POL’Y, 515, 515, 527-28 (2000) (discussing the upcoming difficulties in anticipation of litigation related to the computer failures arising from the Y2K Millennium bug).

¹¹ Several commercial spaceflight companies have announced the prices for their first passenger flights, all of which cost tens of thousands of dollars. Virgin Galactic charges \$250,000 for its flights. *Booking*, VIRGIN GALACTIC, http://www.virgingalactic.com/booking/#reservation_options (last visited Aug. 19, 2013). Space Adventures will charge \$110,000 for its initial flights. *Suborbital Spaceflight*, SPACE ADVENTURES, <http://www.spaceadventures.com/index.cfm?fuseaction=suborbital.welcome> (last visited Aug. 19, 2013). XCOR Aerospace will charge \$95,000 for its initial flights. KLEINMAN ET AL., *supra* note 2, at 26.

and the high net worths of the prospective spaceflight participants,¹² legal action against a private commercial spaceflight company could result in million-dollar losses,¹³ which could potentially bankrupt the company.¹⁴ Moreover, as a result of the relatively untested technology and risks involved,¹⁵ safety is a major concern. Indeed, approximately four percent of all people who have flown in space have perished.¹⁶ According to Virgin Galactic CEO Richard Branson, “a private program can’t afford to lose anybody.”¹⁷

The anticipated problems of private commercial spaceflight are compounded by a statutory and regulatory regime that, even before any legal challenges have arisen,¹⁸ has been widely deemed unworkable.¹⁹ The existing system is a mishmash

¹² Editorial, *Space Law: A New Frontier for Commercial Law*, METRO. CORP. COUNS., 35 (Nov. 7 2012), available at <http://www.metrocorp.counsel.com/articles/21106/space-law-new-frontier-commercial-law>; see generally James Pearn, *Virgin Galactic Passenger List*, J2P2, <http://www.j2p2.com/virgin-galactic-passenger-list> (last visited Aug. 19, 2013) (listing entrepreneurs, CEOs, and celebrities as among the first passengers).

¹³ Arthur Piper, *The Right Stuff: Barack Obama’s Enthusiasm for Expanding the Private Sector’s Role in Space Is Timely as Global Regulation Loosens*, INT’L B. NEWS (Oct. 2010), available at <http://www.ibanet.org/Article/Detail.aspx?ArticleUid=3ED3E145-68CA-440F-B1B6-DF545BBC65A6>.

¹⁴ See Leigh Buchanan, *Richard Branson: “Screw It. Let’s Do It”*, INC. MAG. (Oct. 31, 2012), available at <http://www.inc.com/magazine/201211/leigh-buchanan/sir-audacity-richard-branson.html>.

¹⁵ “Spaceflight is an inherently risky endeavor. Harm can occur at every stage of flight.” KLEINMAN ET AL., *supra* note 2, at 103-04 (detailing instances of death during the preflight, launch, and reentry phases, and also the possibility for harm to non-participants). See generally KAYSER, *supra* note 9, at 5-8.

¹⁶ Jeff Foust, *Weighing the Risks of Human Spaceflight*, SPACE REV. (July 21, 2003), <http://www.thespacereview.com/article/36/1>. Former astronaut Rick Hauck explained his methodology for coming to this conclusion during a May 2003 address at the Woodrow Wilson International Center for Scholars in Washington, DC: 18 out of 430 people who have flown in space died, including 14 on United States operated Space Shuttles, and four on Soviet Union operated Soyuz spacecraft. *Id.* Additionally the Space Shuttle program has had a “40% vehicular failure rate.” Carol Pinchefskey, *5 Horrifying Facts You Didn’t Know About the Space Shuttle*, FORBES (Apr. 18, 2012), <http://www.forbes.com/sites/carolpinchefskey/2012/04/18/5-horrifying-facts-you-didnt-know-about-the-space-shuttle/> (explaining that two out of the total fleet of five Space Shuttles suffered fatal destruction).

¹⁷ Buchanan, *supra* note 14.

¹⁸ To be sure, lawsuits concerning events that relate to outer space have been litigated. However, they concerned matters such as the enforceability of liability waivers in satellite launch malfunction cases. See, e.g., *Appalachian Ins. Co. v. McDonnell Douglas Corp.*, 214 Cal. App. 3d 1 (Ct. App. 1989); *Martin Marietta Corp. v. Int’l Telecommc’ns Satellite Org.*, 991 F.2d 94 (4th Cir. 1992). Additionally, courts issued “opinions that address aerospace activities, among other contexts, in terms of contract, tort, property, patent, and even tax law.” Timothy M. Ravich, *2010: Space Law in the Sunshine State*, 84 FLA. B.J. 25, 25 (2010) (citations omitted).

¹⁹ See, e.g., GÉRARDINE MEISHAN GOH, *DISPUTE SETTLEMENT in INTERNATIONAL SPACE LAW: A MULTI-DOOR COURTHOUSE FOR OUTER SPACE* 3, 7 (2007); Frans. G. von der Dunk, *Too-Close Encounters of the Third-Party Kind: Will the Liability Convention Stand the Test of the Cosmos 2251-Iridium 33 Collision?*, SPACE &

of international agreements, federal statutes and regulations, and state²⁰ laws which combine to form an asynergistic regime that is simultaneously outdated and untested.²¹

Accordingly, this note will argue that the current body of law governing private commercial spaceflight in the United States is structured in a manner that harms two seemingly inapposite but coterminous interests: (1) the ability of victims to recover damages, and (2) the healthy development of the commercial spaceflight industry. Instead of supporting those interests, the U.S. space law regime encourages short-term economic goals that are ultimately self-defeating.

Space law is rooted in a victim-oriented tradition that dates back to its origins.²² Since then, the United States Congress has reaffirmed its obligations under international agreements to uphold those ideals as applied to private commercial spaceflight,²³ and high-ranking government officials have expressed their commitment to minimizing risks to individuals involved in these activities.²⁴ Nevertheless, Congress, by leaving gaps in federal law, has constructively pushed states to pass limited liability statutes, which have the purpose of protecting spaceflight operators from lawsuits at the expense of potential victims. This represents, at the minimum, an abrogation of the longstanding victim-oriented approach that the U.S. pledged to uphold, and that other States have relied upon. Congress should pass legislation that removes limited liability.

Additionally, limited liability statutes impair industry development.²⁵ The commercial spaceflight industry must grow

TELECOMMUN. L. PROGRAM FAC. PUBL'NS 199, 200, 205-06 (2010), available at <http://digitalcommons.unl.edu/spacelaw/28>.

²⁰ *N.B.* For the purposes of this note, the capitalized "State" refers to nation states, as traditionally used in the field of international relations. The uncapitalized "state" refers to one of the fifty federated states of the United States of America.

²¹ See Ravich, *supra* note 18, at 32 ("[A]erospace operators will require counsel to navigate them through the current patchwork of space law, *i.e.*, dated international treaties, 'soft law' resolutions, different state laws, multiple executive national space policy statements, and conflicting government instructions and directives."); see, *e.g.*, von der Dunk, *supra* note 19, at 200, 205-06; Brian Weeden, *2009 Iridium-Cosmos Collision Fact Sheet*, SECURE WORLD FOUND. 2 (Nov. 10, 2010), available at http://swfound.org/media/6575/2009_iridium-cosmos_factsheet.pdf.

²² See *infra* Part I.B.

²³ See *infra* Part I.B.2.

²⁴ *Subcommittee Examines FY13 FA Office of Commercial Space Transportation Budget Proposal*, COMMITTEE SCI., SPACE, & TECH. (Mar. 20, 2012), <http://science.house.gov/press-release/subcommittee-examines-fy13-faa-office-commercial-space-transportation-budget-proposal> (citing statements from House Subcommittee Chairman Steven Palazzo and testimony from Federal Aviation Administration Associate Administrator for Commercial Space Transportation, Dr. George Nield).

²⁵ See *infra* Part II.

beyond its current customer base of very high-net-worth individuals to realize long-term expansion and profitability. However, to support that growth, private commercial spaceflight companies must first create a track record of safe flights.²⁶ The limited liability model inhibits this process by discouraging the risk-averse mass-market customer, thereby restricting the potential client base. This effectively mortgages the commercial spaceflight industry's overall development to further the immediate needs of the space tourism business, which is a mere subset of the industry.²⁷ As a result, other segments of private commercial spaceflight—like point-to-point operations,²⁸ which is projected to provide ultra-fast transportation between any locations on Earth in two hours²⁹—suffer.

Part I of this note gives an overview of the existing law relevant to private commercial spaceflight, and argues that there is overwhelming international agreement and a longstanding policy recognizing that victims of injuries arising from spaceflight should have mechanisms for recovery. While international law imposes some restrictions on U.S. policy, it is, on balance, only a minor factor. The key issue is deficiencies in federal statutes and regulations that permit states to pass limited liability laws. Part II argues that Congress should pass legislation preempting state limited liability statutes to satisfy the dual goals of preserving the victim-oriented heritage of international space law, and promoting the healthy and prolonged growth of the commercial spaceflight industry. In light of the increasing promulgation of state limited liability statutes, Congress must act quickly.

²⁶ See von der Dunk, *supra* note 2, at 407.

²⁷ For an overview of the different types of prospective businesses that encompass the commercial spaceflight industry, see von der Dunk, *supra* note 2, at 403-10 (listing orbital space tourism, suborbital space tourism, suborbital private spaceflight, hotels in orbit, and private flights to the moon).

²⁸ Point-to-point space transportation involves “climbing to an altitude outside of most of the atmosphere, maintaining a speed of Mach 5 to Mach 10 for a period of an hour or more, and then landing at a destination different from the launch point.” JACKSONVILLE AVIATION AUTHORITY, CECIL SPACEPORT MASTER PLAN (Draft) 1-2 (Mar. 2012), available at <http://www.flyjacksonville.com/Cecil/Spaceport/spaceport-mp.pdf>.

²⁹ Buchanan, *supra* note 14.

I. THE DEVELOPMENT OF PRIVATE COMMERCIAL SPACEFLIGHT LAW

A. *Overview*

Private commercial spaceflight in the United States is governed by international, federal, and state law.³⁰ The overarching field of space law was first institutionally recognized by the international community in 1958 when the United Nations General Assembly created the Committee on the Peaceful Uses of Outer Space to address the legal issues in space activities.³¹ The United Nations originally formed the Committee on an ad hoc basis in response to the Soviet Union's launch of Sputnik, the first artificial satellite placed into Earth's orbit,³² and soon converted it into a permanent committee.³³ Following years of negotiations, the Committee recommended, and the United Nations unanimously voted to adopt, the landmark Outer Space Declaration of 1963.³⁴ Most of that nonbinding resolution was formalized shortly thereafter by the ratification of the Outer Space Treaty of 1967,³⁵ which has been described by commentators as "the foundation of . . . space law [that] . . . set the framework and cooperative tone . . . in outer space activities."³⁶ This landmark document was well-received by a

³⁰ See generally R. BENDER, *SPACE TRANSPORT LIABILITY: NATIONAL AND INTERNATIONAL ASPECTS*, ch. 15, 279-353 (1995).

³¹ Vladimir Kopal, *The Role of United Nations Declarations of Principles in the Progressive Development of Space Law*, 16 J. SPACE L. 5, 5-6 (1988).

³² Brian Wessel, *The Rule of Law in Outer Space: The Effects of Treaties and Nonbinding Agreements on International Space Law*, 35 HASTINGS INT'L & COMP. L. REV. 289, 290-91 (2012).

³³ P.P.C. HAANAPPEL, *THE LAW AND POLICY OF AIR SPACE AND OUTER SPACE: A COMPARATIVE APPROACH* 8 n.43 (2003).

³⁴ Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space, G.A. Res. 1962, U.N. GAOR, 18th Sess., Supp. No. 15, U.N. Doc. A/5515 (Dec. 13, 1963), available at <http://www.unoosa.org/oosa/SpaceLaw/lpos.html>; see Kopal, *supra* note 31, at 6-7 ("[T]he first legislative act . . . in the field of space law emerged as the 1963 Declaration . . ."); see generally UNITED NATIONS TREATIES AND PRINCIPLES ON OUTER SPACE AND RELATED GENERAL ASSEMBLY RESOLUTIONS v-vi (2002), available at http://www.oosa.unvienna.org/pdf/publications/st_space_11rev2E.pdf. Several other events predate the Outer Space Declaration of 1963, which was the product of years of international cooperation. For a brief discussion on the work done by non-governmental organizations other than the United Nations, see Kopal, *supra* note 31, at n.6.

³⁵ Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205 [hereinafter *Outer Space Treaty*], reprinted in UNITED NATIONS TREATIES AND PRINCIPLES ON OUTER SPACE 3-8, *supra* note 34.

³⁶ THOMAS GANGALE, *THE DEVELOPMENT OF OUTER SPACE: SOVEREIGNTY AND PROPERTY RIGHTS IN INTERNATIONAL SPACE LAW* 50 (2009) (quoting the U.S. advisor to the United Nations Kenneth Hodgkins).

majority of the world, having been ratified by 101 States.³⁷ Indeed, the Outer Space Treaty is so widely accepted that it is part of customary international law,³⁸ and may therefore apply even to countries that are not signatories.³⁹ Accordingly, the “international community gives great weight to the commitments under the treaty and expects States to adhere to them.”⁴⁰

But by 1979, the “original euphoria”⁴¹ that fed the early development in the field had been “exhaust[ed],”⁴² and no additional space law treaties have come into force since.⁴³ Indeed, the last of these treaties, the Moon Agreement,⁴⁴ has only been ratified by 13 States, none of which are major space powers.⁴⁵ Accordingly, although the Moon Agreement “has frequently featured prominently in debates on international

³⁷ Wessel, *supra* note 32, at 292.

³⁸ “Customary international law [CIL] results from a general and consistent practice of states followed by them from a sense of legal obligation.” RESTATEMENT (THIRD) OF FOREIGN RELATIONS LAW § 102(2) (1987). The “conventional wisdom” is that customary international law “bind[s] nations with the same force as treaties.” Jack L. Goldsmith & Eric A. Posner, *A Theory of Customary International Law*, 1 (Law & Economics Working Paper No. 63 4 1998), available at <http://www.law.uchicago.edu/files/files/63.Goldsmith-Posner.pdf>. Moreover, “[g]overnments take care to comply with CIL, . . . [n]ational courts apply CIL as a rule of decision, . . . [n]ations argue about whether certain acts violate CIL, and [v]iolations of CIL are grounds for war or an international claim.” *Id.* at 1.

³⁹ KLEINMAN ET AL., *supra* note 2, at 58; Wessel, *supra* note 32, at 297; see Andrei D. Terekhov, *UN General Assembly Resolutions and Outer Space Law*, Proceedings of the International Institute of Space Law 97, 103 (1997), reprinted in *SPACE LAW* (Francis Lyall and Paul B. Laren eds., 2007).

⁴⁰ KLEINMAN ET AL., *supra* note 2, at 61.

⁴¹ Kopal, *supra* note 31, at 20.

⁴² *Id.*

⁴³ See Timothy G. Nelson, *The Moon Agreement and Private Enterprise: Lessons from Investment Law*, 17 ILSA J. INT’L & COMP. L. 393, 394 (2011). Between 1967 and 1979, United Nations member states ratified five treaties regarding outer space:

Among the five core treaties adopted by the United Nations at the outset of the era of human spaceflight are the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies, Jan. 27, 1967, 18 U.S.T. 2410, 610 U.N.T.S. 205; Convention on International Liability for Damages Caused by Space Objects, Mar. 29, 1972, 961 U.N.T.S. 187; Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space, Apr. 22, 1968, 19 U.S.T. 7570, 672 U.N.T.S. 119; Convention on Registration of Objects Launched into Outer Space, Apr. 14, 1975, 28 U.S.T. 695, 1023 U.N.T.S. 187; and Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 18, 1979, 1363 U.S.T. 3.

Ravich, *supra* note 18, at 32 n.1 (citations omitted); see also Wessel, *supra* note 32, at 292-94.

⁴⁴ Agreement Governing the Activities of States on the Moon and Other Celestial Bodies, Dec. 18, 1979, 1363 U.S.T. 3 [hereinafter Moon Agreement], reprinted in UNITED NATIONS TREATIES AND PRINCIPLES ON OUTER SPACE 27-35, *supra* note 34.

⁴⁵ Wessel, *supra* note 32, at 293.

space law, it has not had a large practical impact⁴⁶ and is now considered to be “dormant.”⁴⁷

Following that period of progress, the United Nations General Assembly, in the absence of any meaningful international support for additional treaties,⁴⁸ returned to passing declarations of principles.⁴⁹ These declarations operate as “the first stage in the lawmaking process, serving as a basis for negotiating international agreements on the given subjects, and as an initial formulation of future provisions of the respective treaties.”⁵⁰ They are not binding “and do not create norms of international law.”⁵¹ Nevertheless, those declarations are “generally followed by spacefaring nations and may have attained the status of customary international law, although this has not been tested judicially.”⁵² In all, there have been five declarations, the last of which was passed in 1996.⁵³

In 1984, the United States Congress, recognizing the need for “promoting the commercial space sector,”⁵⁴ began “developing a framework for commercial space transportation.”⁵⁵ The federal legislative and regulatory system is incomplete,⁵⁶ however, and the five states most directly impacted by spaceflight have passed limited liability laws in order to fill gaps in the national structure.⁵⁷ The last major holdout, California, finally relented in 2012.⁵⁸ Today, almost every state

⁴⁶ *Id.* at 293-94.

⁴⁷ KLEINMAN ET AL., *supra* note 2, at xviii.

⁴⁸ See P.J. Blount, *Renovating Space: The Future of International Space Law*, 40 DENV. J. INT'L L. & POL'Y 515, 524 (2012).

⁴⁹ Wessel, *supra* note 32, at 294.

⁵⁰ Kopal, *supra* note 31, at 19.

⁵¹ Terekhov, *supra* note 39, at 97.

⁵² KLEINMAN ET AL., *supra* note 2, at 67.

⁵³ See generally Terekhov, *supra* note 39, at 98-102. The five declarations, aside from the Outer Space Declaration of 1963, are Principles Governing the Use by States of Artificial Earth Satellites for International Direct Television Broadcasting, U.N. Res. 37/92 (Dec. 10, 1982); Principles Relating to Remote Sensing of the Earth from Outer Space, U.N. Res. 41/65 (Dec. 3, 1986); Principles Relevant to the Use of Nuclear Power Sources in Outer Space, U.N. Res. 47/68 (Dec. 14, 1992); and Declaration on International Cooperation in the Exploration and Use of Outer Space for the Benefit and in the Interest of All States, Taking into Particular Account the Needs of Developing Countries U.N. Res. 51/122 (Dec. 13 1996).

⁵⁴ KLEINMAN ET AL., *supra* note 2, at 76.

⁵⁵ *Id.*

⁵⁶ Federal legislation does not address whether spaceflight companies are liable to flight crews, spaceflight participants or their heirs. Accordingly, those issues “must instead be addressed by [s]tate law . . .” KLEINMAN ET AL., *supra* note 2, at 107.

⁵⁷ Those states—Virginia, Florida, New Mexico, Texas, and California—either have institutional ties to government-sponsored spaceflight, or have attracted investment from the private commercial spaceflight industry. See *infra* Part I.C.

⁵⁸ See Assemb. B. 2243, Ch. 416 (Cal. 2012); Joe Weichman, *Remaining Competitive: Extending Spaceflight Protections* 10 (May 2013), available at

with a strong interest in the development of commercial spaceflight has passed legislation on the matter.⁵⁹

B. International Law Foundations for the Victim-Oriented Approach of Commercial Spaceflight

1. The Outer Space Treaty⁶⁰

Referred to as a “constitution for outer space” by some commentators,⁶¹ the Outer Space Treaty was never truly intended to address commercial activity.⁶² It is well supported that the drafters were principally concerned with matters of global security, including the “prevention of the arms race in outer space.”⁶³ Given the highly contentious nature of the Cold War era, it should come as no surprise that avoiding war took precedence.⁶⁴ Nevertheless, commercial activity was “to a small extent envisioned . . . [and] [t]he idea of private actors was not completely ignored.”⁶⁵ To that point, Article VI of the Outer Space Treaty provides in pertinent part that:

Parties to the Treaty shall bear international responsibility for national activities in outer space . . . whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space . . . shall require authorization and continuing supervision by the appropriate State Party to the Treaty.⁶⁶

Additionally, Article VII of the treaty provides that:

<http://www.makingitincalifornia.com/documents/Remaining%20Competitive%20-%20Extending%20Spaceflight%20Protections.pdf>.

⁵⁹ See generally KLEINMAN ET AL., *supra* note 2, at 107-10; Leonard David, *Private Space Travel Gets a Big Boost in California*, SPACE.COM (Sept. 21, 2012), <http://www.space.com/17720-private-spaceflight-liability-california-law.html>.

⁶⁰ Outer Space Treaty, *supra* note 35.

⁶¹ Wessel, *supra* note 32, at 292 (quoting Helmet Tuerk, *The Negotiation of the “Moon Agreement”*, 52 PROC. COLLOQUIUM ON LAW OUTER SPACE 491, 493 (2010)). But see Ivan A. Vlastic, *The Space Treaty: A Preliminary Evaluation*, 55 CAL. L. REV. 507, 508 (1967) (“The result is a document which expresses general principles in diverse areas but breaks very little new ground. It leaves unsolved a number of problems which urgently need legal regulation.”).

⁶² See generally Vlastic, *supra* note 61. It was meant to codify the Outer Space Declaration, which also did not concern private activity. KAYSER, *supra* note 9, at 37.

⁶³ Vlastic, *supra* note 61, at 512; see, e.g., Blount, *supra* note 48, at 517-18.

⁶⁴ Ravich, *supra* note 18, at 26.

⁶⁵ Blount, *supra* note 48, at 518.

⁶⁶ Outer Space Treaty, *supra* note 35, art. VI.

Each State Party to the Treaty that launches or *procures the launching* of an object into outer space . . . and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space . . .⁶⁷

Remarkably, signatories of the treaty agreed to be responsible and liable⁶⁸ for the actions of private actors under their governance for their space activities.⁶⁹ Accordingly, Articles VI and VII serve to promote governmental regulation of private action because of, among other things, the risk of derivative liability.⁷⁰ Given the high expense of spaceflight at the time,⁷¹ however, it was virtually unimaginable that any

⁶⁷ *Id.* art. VII (emphasis added).

⁶⁸ For an explanation of the difference between “responsibility” and “liability,” see KAYSER, *supra* note 9, at 31 (quoting Bin Cheng, *Article VI of the 1967 Space Treaty Revisited: “International Responsibility,” “National Activities,” and “The Appropriate State,”* 26:1 J. SPACE L. 7, 9 (1998) (“Responsibility means essentially . . . answerability for one’s acts and omissions, . . . for their consequences, . . . for compliance with his or her legal duties, and for any breaches thereof . . . [L]iability is . . . the obligation to bear the consequences of a breach of a legal duty, in particular the obligation to make reparation for any damage caused, especially in the form of a monetary payment.”)). Professor Peter P.C. Haanappel analyzes the terms in the following manner:

The English text of space law treaties and other texts uses the terms “responsibility” and “liability,” and the corresponding adjectives “responsible” and “liable.” Other languages, especially the Latin ones (such as French and Spanish) only have one term, from the same source as the English “responsibility.” It is submitted that where, taking English as a guideline, “responsibility” or “responsible” is used, this essentially means “to have a duty” (the *debitum* from Roman law); where “liability” or “liable” is used, this essentially means “to have an obligation to repair, to pay damages (the *obligatio* from Roman law).

HAANAPPEL, *supra* note 33, at 8 n.48. Other scholars note that “[t]he term ‘responsibility’ has been variously defined, sometimes equated with and sometimes distinguished from the term ‘liability.’” BENDER, *supra* note 30, at 282.

⁶⁹ Blount, *supra* note 48, at 518.

⁷⁰ See Benjamin Perlman, Note, *Grounding U.S. Commercial Space Regulation in the Constitution*, 100 GEO L.J. 929, 934 (2012); see also Zhao Yun, *A Legal Regime for Space Tourism: Creating Legal Certainty in Outer Space*, 74 J. AIR L. & COM. 959 (2009).

⁷¹ Claude Lafleur, *Costs of US Piloted Programs*, SPACE REV. (Mar. 8, 2010), <http://www.thespacereview.com/article/1579/1>. NASA’s Mercury program, which operated six flights from 1959 to 1963, cost the equivalent of \$2.1 billion in 2013 dollars, which equals \$342.8 million per flight. *Id.* NASA’s Gemini program, which operated ten flights from 1962 to 1967, cost \$9.1 billion in 2013 dollars, which equals \$910.3 million per flight. *Id.* NASA’s Apollo program, which operated eleven flights from 1959 to 1973, cost \$107.5 billion in 2013 dollars, which equals \$9.8 billion per flight. *Id.* Finally NASA’s Space Shuttle program, which operated 134 flights from 1972 to 2012, cost \$198.6 billion in 2010 dollars, which equals \$1.4 billion per flight. *Id.* All preceding 2013 dollar amounts were calculated using the US Inflation Calculator, a website that “uses the latest US government CPI [consumer price index] data published on Sept. 17, 2013 to adjust for inflation and calculate the cumulative

non-governmental entity could participate in space activity, at least for the foreseeable future. Lack of technical expertise notwithstanding, the average cost per flight in 1967, over \$600 million, would have been unaffordable.⁷²

While the treaty laid the groundwork for commercial space activity, there was no realistic possibility for that industry to emerge in the foreseeable future.⁷³ Accordingly, the drafters had no reason to seriously consider addressing issues related to commercial spaceflight.⁷⁴ Instead, the Outer Space Treaty should be understood to provide only general principles for subsequent lawmakers to rely and build upon.⁷⁵ Most notably, the treaty does not address the key issues of enforceability and dispute resolution.⁷⁶

2. Convention on International Liability for Damage Caused by Space Objects of 1972 (Liability Convention)⁷⁷

The Liability Convention is an extension of Articles VI and VII of the Outer Space Treaty.⁷⁸ As the five-year gap between the two treaties suggests, coming to an agreement regarding the specific legal issues addressed by the Liability Convention was a deliberate affair that required accounting for the differences among the drafters' legal systems.⁷⁹ There was a general consensus that the treaty was essential,⁸⁰ but the

inflation rate." US INFLATION CALCULATOR, <http://www.usinflationcalculator.com> (last visited Oct. 6, 2013). During this time, cost was not an issue because the space program was viewed as a means to garner public support for the United States during the Cold War against the Soviet Union. Michio Kaku, *The Cost of Space Exploration*, FORBES (July 16, 2009), <http://www.forbes.com/2009/07/16/apollo-moon-landing-anniversary-opinions-contributors-cost-money.html>.

⁷² The average price for the Mercury flights was \$342.8 million, and the average price for the Gemini flights was \$910.3 million, which, if averaged, gives an average flight cost of \$626.6 million. See *supra* note 71.

⁷³ GOH, *supra* note 19, at 163.

⁷⁴ See Blount, *supra* note 48, at 518.

⁷⁵ See BRUCE A. HURWITZ, STATE LIABILITY FOR OUTER SPACE ACTIVITIES IN ACCORDANCE WITH THE 1972 CONVENTION ON INTERNATIONAL LIABILITY FOR DAMAGE CAUSED BY SPACE OBJECTS 9 (1992).

⁷⁶ GOH, *supra* note 19, at 29.

⁷⁷ Convention on International Liability for Damage Caused by Space Objects, Mar. 29 1972 24 U.S.T. 2389, 961 U.N.T.S. 187 [hereinafter Liability Convention], reprinted in UNITED NATIONS TREATIES AND PRINCIPLES ON OUTER SPACE 13-21, *supra* note 34.

⁷⁸ Liability Convention, *supra* note 77; see also KAYSER, *supra* note 9, at 33; HURWITZ, *supra* note 75, at 9.

⁷⁹ See KAYSER, *supra* note 9, at 33.

⁸⁰ HURWITZ, *supra* note 75, at 13.

necessary detailed legal work⁸¹ precluded a repeat of the speedy drafting process of the Outer Space Treaty.⁸² And although the spacefaring nations clearly had an interest in the matter, non-space powers were also eager to bring about an agreement that would protect them in the event of accidents they believed were certain to arise.⁸³ The final product reflected those concerns, and supports the view that the Liability Convention is “victim oriented.”⁸⁴ Therefore, by ratifying the Convention, the United States implicitly recognized that activities in outer space, while important, are dangerous and must provide injured parties with a means for compensation.⁸⁵

To accomplish its framers’ victim-oriented goals, the Liability Convention sets forth a regime to govern liability for damage inflicted during space activities.⁸⁶ The drafters expanded upon the Outer Space Treaty by clarifying formerly uncertain terms and ideas.⁸⁷ Also, the Convention provides parties with a mechanism to adjudicate disputes and grant relief.⁸⁸ Although it is arguable that the Liability Convention’s additions to the Outer Space Treaty have thus far not resulted in tangible, or even theoretical, benefits for victims,⁸⁹ it nevertheless still represents the international community’s collective intent to “restore injured parties to their pre-accident condition.”⁹⁰

a. Damages

Article I of the Liability Convention defines damages—a previously undefined term in space law—as the “loss of life, personal injury or other impairment of health; or loss of or damage to property of States or of persons, natural or juridical, or property of international intergovernmental organizations.”⁹¹ In regard to personal injuries, Article I encapsulates both

⁸¹ See KAYSER, *supra* note 9, at 33.

⁸² See Vlastic, *supra* note 61, at 507.

⁸³ See HURWITZ, *supra* note 75, at 10.

⁸⁴ *Id.* at 9-10.

⁸⁵ See generally *id.* at 10-11 (discussing the compensation scheme developed); see also KAYSER, *supra* note 9, at 47-52 (discussing the agreement among the international community that victims are entitled to means for recovery in incidents related to outer space activities).

⁸⁶ Liability Convention, *supra* note 77; see also HURWITZ, *supra* note 75, at 9-10; KAYSER, *supra* note 9, at 33.

⁸⁷ See KAYSER, *supra* note 9, at 33.

⁸⁸ Liability Convention, *supra* note 77.

⁸⁹ See, e.g., GOH, *supra* note 19, at 2-3; von der Dunk, *supra* note 19, at 200, 205-06.

⁹⁰ BENDER, *supra* note 30, at 313.

⁹¹ Liability Convention, *supra* note 77.

direct damages—physical injuries and illnesses—and also indirect damages, such as lost wages, pain and suffering, and humiliation.⁹² While the treaty text does not explicitly include indirect damages in its definition of damages, most scholars agree that victims can recover for them.⁹³ Indeed, allowing for recovery of indirect damages would comport with both the victim-oriented heritage of outer space law,⁹⁴ and also with other, similar international law.⁹⁵ No similar debate exists regarding the comparatively straightforward area of both direct and indirect property damage.⁹⁶

b. Liability

Next, the Convention addresses liability in several places. Article II provides that “[a] launching State shall be absolutely liable to pay compensation for damage caused by its space object on the surface of the Earth or to aircraft in flight.”⁹⁷ Article I, Section C defines launching State in four ways:

- (1) “[a] State which launches . . . a space object;”⁹⁸
- (2) “[a] State which . . . procures the launching of a space object;”⁹⁹
- (3) “[a] State from whose territory . . . a space object is launched;”¹⁰⁰
and
- (4) “[a] State from whose . . . facility a space object is launched.”¹⁰¹

Additionally, “[t]he term ‘launching’ includes attempted launching.”¹⁰² Read together with Article VI of the Outer Space Treaty, under Article II of the Liability Convention, a

⁹² See KAYSER, *supra* note 9, at 47-49.

⁹³ See, e.g., HURWITZ, *supra* note 75, at 13-16 (concluding that the Liability Convention governs indirect damages based upon analysis of legislative history and analogous international agreements); KAYSER, *supra* note 9, at 49-50 (arguing that the Vienna Convention on the Law of Treaties supports inclusion of indirect damages). *But cf.* BENDER, *supra* note 30, at 301-02 (arguing that “[a] knowledgeable United States commentator is . . . on record as stating the Liability Convention does not permit . . . indirect damages” and that international law generally allows for narrower recovery).

⁹⁴ See HURWITZ, *supra* note 75, at 14-16.

⁹⁵ See *id.* at 16-18 (cataloguing recognition of indirect damages in areas such as air law and nuclear energy law).

⁹⁶ See KAYSER, *supra* note 9, at 47-49.

⁹⁷ Liability Convention, *supra* note 77, art. II.

⁹⁸ *Id.*

⁹⁹ *Id.*

¹⁰⁰ *Id.*

¹⁰¹ *Id.* This note will refer to those four definitions as being part of the launch, procurement, territory, and facility clauses, respectively.

¹⁰² *Id.* But this more expansive definition of launching may not survive a more probing analysis. For a detailed look at the potential inadequacy of the definition, see HURWITZ, *supra* note 75, at 20-21.

government is both internationally responsible and strictly liable for damages inflicted below Earth's orbit¹⁰³ by a private actor, such as a private commercial spaceflight company, so long as that government qualifies as a launching State.¹⁰⁴

While Article I, Section C makes it clear that a State is responsible for its own activities in space, when it comes to determining who is liable for damages arising out of private commercial spaceflight, the "launching State" designation can become a source of controversy.¹⁰⁵ It is uncertain what private actions will trigger State liability under the procurement, territory, and facility clauses of Article I, Section C.¹⁰⁶

For instance, an expansive reading of the procurement clause would find that there is State liability even when its "nationals have [merely] financed or ordered the launching."¹⁰⁷ Under this scenario, a private actor could be making his or her State liable "against its will."¹⁰⁸ Alternatively, it may be argued that no State "procures the launching" when a private company contracts with another private company for a space launch, but without any government involvement.¹⁰⁹

This issue also arises under the facility clause because of the advent of privately-owned spaceports,¹¹⁰ which calls into question whether they may legally be designated as State facilities.¹¹¹ It is more settled, on the other hand, that when the facility is State-owned, liability is proper whether it is located in "foreign countries . . . outer space, on the high seas or the

¹⁰³ See Outer Space Treaty, *supra* note 35; Liability Convention, *supra* note 77.

¹⁰⁴ von der Dunk, *supra* note 2, at 410.

¹⁰⁵ See *id.* at 410-11.

¹⁰⁶ *Id.*

¹⁰⁷ HURWITZ, *supra* note 75, at 22.

¹⁰⁸ *Id.*

¹⁰⁹ See von der Dunk, *supra* note 2, at 411.

¹¹⁰ "A spaceport is the infrastructure at either the origin or destination of a spaceflight. It provides the essential infrastructure and related ground processing operations needed for space access as well as the facilities, organizations, and operations required to safely manage spaceflight." ADVANCED SPACEPORT TECHNOLOGIES WORKING GROUP, BASELINE REPORT: CHARTING AMERICA'S PATH TOWARDS LOW-COST, ROUTINE ACCESS TO SPACE vii (Nov. 2003), available at http://weboflife.nasa.gov/shuttle/nexgen/Nexgen_Downloads/ASTWGI/. "Many states have developed or are developing commercial spaceports, including New Mexico, Florida, Texas, Oklahoma, Virginia, Alaska, Colorado and California." *Partnerships to Advance the Business of Space: Hearing Before the Senate Committee on Commerce, Science and Transportation, Subcommittee*, 113th Cong. 3 (2013) (testimony of Capt. Michael Lopez-Algeria), available at http://www.commerce.senate.gov/public/?a=Files.Serve&File_id=18d37b64-c839-46f0-a443-aebf6e47c009.

¹¹¹ See von der Dunk, *supra* note 2, at 411.

ocean floor, or in other territories outside the national jurisdiction of any State.”¹¹²

Finally, the territory clause is relevant in regard to assigning liability for launches that occur in territories outside any jurisdiction, such as international waters.¹¹³ It is uncertain how the Liability Convention would apply to this type of launch because “[h]aving ‘territory’ in the international legal sense of the word is exclusively reserved for [S]tates.”¹¹⁴ In sum, as a result of the uncertainties arising from the launching State designation, it would be reasonable for “concerned [S]tates to exercise their national jurisdiction to control private spaceflight in an effort to guard against liability and any obligation to pay for the damage caused.”¹¹⁵

Under the victim-oriented perspective of the Convention, the advantage of having these four definitions is clear: it gives an injured party more options for recovery.¹¹⁶ Articles IV and V advance this objective by providing for joint and several liability for States that jointly launch a space object.¹¹⁷ Moreover, Article V forecloses potential loopholes by declaring that “[a] State from whose territory or facility a space object is launched shall be regarded as a participant in a joint launching.”¹¹⁸ Accordingly, a State that permits use of its territory or facilities cannot escape liability under the Convention.¹¹⁹

Additionally, the strict liability regime is justified on the grounds that the resulting damage will likely concern causes of action that are difficult to prove under a traditional negligence theory.¹²⁰ Despite huge advances in the field, private commercial spaceflight is still in its infancy and dangerous, and the technologies involved are “shrouded in a web of secrecy.”¹²¹ The

¹¹² HURWITZ, *supra* note 75, at 22.

¹¹³ See von der Dunk, *supra* note 2, at 411. Sea Launch is a private company that provides heavy lift launch services for commercial customers via Odyssey, a refurbished former oil drilling platform on the Pacific Ocean that now operates as a launch platform. *Launch Platform Odyssey*, SEA LAUNCH, http://www.sea-launch.com/launch-q11142-Launch_Platform_iOdysseyi.aspx (last visited Aug. 19, 2013). The company conducts launches from its Pacific Ocean location on the equator to take advantage of Earth’s increased rotation speed at its center, thereby increasing the amount of payload a satellite can carry. Justin Ray, *Sea Launch Rocket Lofts TV Satellite Into Orbit*, SPACE.COM (Aug. 19, 2012), <http://www.space.com/17178-sea-launch-rocket-satellite-success.html>.

¹¹⁴ See von der Dunk, *supra* note 2, at 411 & n.42.

¹¹⁵ *Id.* at 411.

¹¹⁶ HURWITZ, *supra* note 75, at 22.

¹¹⁷ Liability Convention, *supra* note 77, art. IV.

¹¹⁸ *Id.* art. V.

¹¹⁹ See *id.*

¹²⁰ See KAYSER, *supra* note 9, at 50-51.

¹²¹ See HURWITZ, *supra* note 75, at 28.

implications of this are two-fold. First, because injured parties will likely be unable to obtain the secret information, they will encounter unjustly burdensome difficulties in proving an otherwise meritorious case.¹²² Second, the industry is still untested, and there exists neither adequate legislative clarity nor jurisprudence to provide guidance to litigants regarding how to succeed in an outer space negligence suit.¹²³ In sum,

[strict] liability shows the maturity of society . . . [It] shows that society recognizes the benefits of technology and the fact that it cannot be regulated due to the many unknown dimensions involved with its development and exploitation. Yet, the overriding importance of the technology for society means that development must continue and therefore the danger is accepted under the condition that (a) the danger will, with time, fall to an acceptable (normal) level, and (b) until that time, the operator of the technology will be liable to pay compensation for damage caused by such a technology without the victim having to prove negligence.¹²⁴

In the end, the drafters determined that strict liability was appropriate given the danger involved both on Earth and in outer space.¹²⁵

In addition to supporting the imposition of strict liability, the dangerous nature of space activities also justifies the Convention not capping compensation recoverable against a launching State.¹²⁶ To be sure, the negotiating States did consider a limit on compensation, but could not settle on an amount that was “sufficiently high to ensure that the victim would be fully compensated.”¹²⁷

Nevertheless, Article VI provides exceptions to strict liability in two limited situations.¹²⁸ First, exoneration from strict liability may apply if the injured party acted with “gross negligence.”¹²⁹ Second, if the injured party, “with intent to cause damage,” acted or failed to act, then exoneration may apply.¹³⁰ In essence, this shifts the system to one that is more akin to fault liability.¹³¹ However, a launching State that failed to comport

¹²² See *id.* at 29.

¹²³ See *id.*; see also *supra* note 18 and accompanying text.

¹²⁴ See HURWITZ, *supra* note 75, at 36 (alteration in original).

¹²⁵ *Id.* at 28-29.

¹²⁶ See KAYSER, *supra* note 9, at 51.

¹²⁷ HURWITZ, *supra* note 75, at 56 (quoting 1969 U.N.Y.B 47) (discussing the expressions of the Argentina, Iran, and Lebanon delegations to the United Nations).

¹²⁸ Liability Convention, *supra* note 77, art. VI.

¹²⁹ *Id.*

¹³⁰ *Id.*

¹³¹ HURWITZ, *supra* note 75, at 41.

with relevant international law may be precluded from exercising that exemption.¹³²

The liability scheme also changes to common-law fault liability when damage is caused by one space object to another when both are in outer space.¹³³ Article III of the Liability Convention provides that:

In the event of damage being caused elsewhere than on the surface of the Earth to a space object of one launching State or to persons or property on board such a space object by a space object of another launching State, the latter shall be liable only if the damage is due to its fault or the fault of persons for whom it is responsible.¹³⁴

Because the drafters were predominantly concerned with non-commercial spaceflight,¹³⁵ they intended for Article III to apply only to “a collision between space objects in outer space.”¹³⁶ Moreover, the desire to protect victims that is expressed in other parts of the Convention¹³⁷ is absent in Article III, which operates on the theory that all parties able to achieve spaceflight are sufficiently sophisticated to overcome the hurdles that impact non-space-faring parties.¹³⁸ Additionally, they “have assumed the risks of conducting these activities: none should be a privileged victim.”¹³⁹ Nevertheless, the launching State is still liable for the damages caused by those “persons for whom it is responsible.”¹⁴⁰ Although that term is not explicitly defined,¹⁴¹ it may be inferred that certain parties who fall within the definitions set forth in Article I, Section C qualify.¹⁴² This means that even for damages caused by non-government actors in orbit and beyond, the State may be liable, albeit not absolutely.¹⁴³

Additionally, States can find some relief from liability in Article VII, which bars some individuals from bringing a claim under the Liability Convention.¹⁴⁴ Specifically the Convention does not apply to “[f]oreign nationals during such time as they are participating in the operation of that space object . . . or

¹³² Liability Convention, *supra* note 77, art. VI.

¹³³ *See id.* art. III. *See supra* note 3 (delineating when an object is in outer space).

¹³⁴ Liability Convention, *supra* note 77, art. III.

¹³⁵ *See id.*; GOH, *supra* note 19, at 163.

¹³⁶ HURWITZ, *supra* note 75, at 32-33.

¹³⁷ *See supra* notes 82-88 and accompanying text.

¹³⁸ *See* HURWITZ *supra* note 75, at 34.

¹³⁹ *See* KAYSER, *supra* note 9, at 51.

¹⁴⁰ Liability Convention, *supra* note 77, art. III.

¹⁴¹ HURWITZ, *supra* note 75, at 35.

¹⁴² *See id.*; Liability Convention, *supra* note 77, art. I(c).

¹⁴³ Liability Convention, *supra* note 77, art. II-IV.

¹⁴⁴ *Id.* art. VII.

during such time as they are in the immediate vicinity of a planned launching or recovery area as the result of an invitation by that launching State.”¹⁴⁵ The drafters’ reasoning for this carve-out follows their Article III logic that a consenting party should not be given privileged victim status.¹⁴⁶ However, even in this situation, questions regarding the Convention’s applicability may arise in cases where foreign tourists become injured during a spaceport visit to observe launch activities.¹⁴⁷ Given the trend toward making spaceports major tourist destinations,¹⁴⁸ this could be a void in the international law field.¹⁴⁹ In that situation, foreign nationals may simply bring suit outside of the provisions of the Liability Convention.¹⁵⁰

c. Dispute Resolution and Recovery

The Liability Convention does not allow for a private cause of action.¹⁵¹ Instead, under Article VIII, the right to bring claims is exclusive to “[a] State which suffers damage, or whose natural or juridical persons suffer damage.”¹⁵² This means that in any incident, up to three States may have a cause of action: “the State where injury or damage occurs, the State of nationality of the individual victim(s), and the State of permanent residence of the individual victim(s).”¹⁵³ Under this system, a hierarchy of decreasing priority prevents overlapping claims.¹⁵⁴ Accordingly, the “[s]econd and third ranked States cannot present claims unless the preceding State chooses not to exercise its right to do so.”¹⁵⁵ Moreover, the claim must be presented to “a launching State.”¹⁵⁶

For a private spaceflight company, one of the most constraining aspects of the Liability Convention’s claim process is that it must rely on a State to bring a claim, or petition the State to act.¹⁵⁷ Worse still is that the only proper target of a suit

¹⁴⁵ *Id.* art. VII.

¹⁴⁶ HURWITZ, *supra* note 75, at 44-46.

¹⁴⁷ *Id.*

¹⁴⁸ See Jesse McKinley, *Spaceport America Eyes the (Near) Future*, N.Y. TIMES (Sept. 7, 2012), <http://travel.nytimes.com/2012/09/09/travel/spaceport-america-eyes-the-near-future.html> (“[O]fficials say they expect to draw as many as 200,000 visitors a year to see the spaceport.”).

¹⁴⁹ HURWITZ, *supra* note 75, at 44.

¹⁵⁰ *Id.*

¹⁵¹ Liability Convention, *supra* note 77, art. VIII; von der Dunk, *supra* note 2, at 413.

¹⁵² Liability Convention, *supra* note 77, art. VIII.

¹⁵³ HURWITZ, *supra* note 75, at 49.

¹⁵⁴ Liability Convention, *supra* note 77, art. VIII.

¹⁵⁵ HURWITZ, *supra* note 75, at 49.

¹⁵⁶ Liability Convention, *supra* note 77, art. VIII.

¹⁵⁷ See KAYSER, *supra* note 9, at 52-53; HURWITZ, *supra* note 75, at 50.

under this system is another State.¹⁵⁸ Outside those options, the private spaceflight company has “neither any recourse nor accountability under the . . . Convention.”¹⁵⁹ Further, because of the required involvement of State actors, the decision to bring suit is an inherently political decision with potential diplomatic ramifications.¹⁶⁰ In fact, Article IX requires that claims be “presented to a launching State through *diplomatic channels*.”¹⁶¹ The State action requirement is exacerbated by the one-year statute of limitations set forth in Article X.¹⁶² Although a time limit on the presentment of claims is not per se unreasonable,¹⁶³ it certainly qualifies as a source of uncertainty for the private actor.¹⁶⁴

Even if the private company is able to persuade its government to bring a claim, the procedures set forth by the Convention are unwieldy and untested.¹⁶⁵ Article XIV states that the dispute will be settled by a Claims Commission,¹⁶⁶ a three-member, ad hoc, quasi-judicial body whose decisions are only “final and binding if the parties have so agreed.”¹⁶⁷ Absent such an agreement, a decision is merely advisory.¹⁶⁸ Additionally, the Liability Convention does not provide for any meaningful procedural rules.¹⁶⁹ Instead, Article XVI only directs that “the Commission shall determine its own procedure,”¹⁷⁰ and that it “shall determine the place or places it shall sit and all other administrative matters.”¹⁷¹ Furthermore, if the suit is successful, there is no explicit requirement for the State to transfer its award to a victim.¹⁷² As a testament to the drafters’ own uncertainty over whether States would adopt the claims

¹⁵⁸ Liability Convention, *supra* note 77, art. II-V.

¹⁵⁹ Yun, *supra* note 70, at 966.

¹⁶⁰ See HURWITZ, *supra* note 75, at 50-51.

¹⁶¹ Liability Convention, *supra* note 77, art. IX (emphasis added).

¹⁶² *Id.* art. X.

¹⁶³ See GOH, *supra* note 19, at 37.

¹⁶⁴ *Id.*

¹⁶⁵ To date, no claims have been fully adjudicated via the Claims Commission procedures of the Liability Convention. Weeden, *supra* note 21, at 2. In fact, the 2009 collision between a U.S. satellite, the Iridium 33, and a Russian satellite, the Cosmos 2251, which seemed to present a storybook opportunity to test the Liability Convention, had its one-year statute of limitation under the Liability Convention pass without any party bringing a claim. *Id.*

¹⁶⁶ Liability Convention, *supra* note 77, art. XIV.

¹⁶⁷ *Id.* art. XIX. As the Brazilian delegation to the United Nations astutely observed, “it was doubtful that a provision in any convention would become binding merely because it was said to be binding.” HURWITZ, *supra* note 75, at 59.

¹⁶⁸ GOH, *supra* note 19, at 38.

¹⁶⁹ Liability Convention, *supra* note 77.

¹⁷⁰ *Id.* art. XVI.

¹⁷¹ *Id.*

¹⁷² HURWITZ, *supra* note 75, at 50.

procedures, Article XI does “not require the prior exhaustion of any local remedies,” nor does it “prevent a State, or natural or juridical persons it might represent, from pursuing a claim in the courts or administrative tribunals or agencies of a launching State.”¹⁷³

3. The International Community’s Collective Intent

The Outer Space Treaty and Liability Convention, read in conjunction, illustrate a major tenet of existing international space law that must translate into commercial space law as well: the State has obligations to uphold, including maintaining the victim-oriented system that it has supported for decades.¹⁷⁴ As applied to commercial spaceflight, that means a State should, at a minimum, recognize the fault liability regime, if not a strict liability regime, and also the possibility of recovery for indirect damages.¹⁷⁵ Additionally, as the lack of use and the confusing rules of the Liability Convention’s claims process make clear, that portion of the treaty’s relevance in the commercial realm is questionable.¹⁷⁶ Accordingly, it is proper for the State to take a more direct approach in regard to adjudicating disputes,¹⁷⁷ while still adhering to the victim-oriented tradition established in international law.

C. *United States Federal Law Continues the Victim-Oriented Tradition*

1. Commercial Space Launch Act (Launch Act)¹⁷⁸

Prior to 1984, no agency was explicitly authorized to regulate private commercial spaceflight.¹⁷⁹ The example of Space Services, Inc. is instructive. In its successful efforts to achieve the first launch of a space object by an American company without direct government participation, Space Services negotiated with over a dozen federal agencies over a

¹⁷³ Liability Convention, *supra* note 77, art. XI.

¹⁷⁴ See KAYSER, *supra* note 9, at 33; HURWITZ, *supra* note 75, at 9-10.

¹⁷⁵ See BENDER, *supra* note 30, at 313-14.

¹⁷⁶ See von der Dunk, *supra* note 19, at 200, 205-06.

¹⁷⁷ See von der Dunk, *supra* note 2, at 411 (“[C]oncerned [S]tates [should] exercise their national jurisdiction to control private spaceflight in an effort to guard against liability and any obligation to pay for damage caused.”).

¹⁷⁸ Commercial Space Launch Act, Pub. L. 98-575, 98 Stat. 3055 (1984) (codified as amended at 51 U.S.C. §§ 50901-50923 (2012)).

¹⁷⁹ KAYSER, *supra* note 9, at 79.

period of six months¹⁸⁰ to gain government approval.¹⁸¹ Among other agencies, NASA, the Coast Guard, Central Intelligence Agency, Department of Defense, Department of State, Federal Aviation Administration, Federal Communications Commission, and Internal Revenue Service all had a hand in regulating a private launch.¹⁸² The process was slow, unpredictable, expensive, and not conducive to smooth business operation.¹⁸³

Accordingly, Congress passed the Launch Act in 1984 to promote the commercial spaceflight industry.¹⁸⁴ Additionally, it sought to simultaneously develop a system to protect the public, principally via the licensing of spaceflight operators.¹⁸⁵ Moreover, Congress intended to create a favorable climate for private actors by dramatically cutting down on bureaucratic hurdles and centralizing all authority to regulating the commercial spaceflight industry to the Secretary of Transportation.¹⁸⁶ To that end, Congress granted the Secretary of Transportation oversight of the recently created Office of Commercial Space Transportation¹⁸⁷ and control over licensing agreements with private actors.¹⁸⁸ Nevertheless, the Secretary must act in a manner that is “consistent with any obligation assumed by the United States in any treaty, convention, or agreement that may be in force between the United States and any foreign nation.”¹⁸⁹

Congress subsequently amended the Launch Act in 1988 to reflect “the necessity [of compensating] individuals for damages incurred in the course of space exploration.”¹⁹⁰ Under the updated statute, there is a three-tier risk allocation structure¹⁹¹ that creates a guaranteed government fund in the event that private insurance is insufficient to cover all of the damages.¹⁹² In the first tier, a private spaceflight operator is

¹⁸⁰ *Id.* at 80-84.

¹⁸¹ Barton E. Showalter, Comment, *In Space, Nobody Can Hear You Scream “Tort!”*, 58 J. AIR L. & COM. 795, 803 (1993).

¹⁸² KAYSER, *supra* note 9, at 80-84.

¹⁸³ *See id.* at 85-90.

¹⁸⁴ KLEINMAN ET AL., *supra* note 2, at 76 (2012).

¹⁸⁵ *Id.*

¹⁸⁶ *Id.*

¹⁸⁷ *See* Anthony R. Filiato, Note, *The Commercial Space Launch Act: America’s Response to the Moon Treaty?*, 10 FORDHAM INT’L L.J. 763, 773-74 (1987).

¹⁸⁸ 51 U.S.C. § 50909 (2012).

¹⁸⁹ *Id.* § 50921(d).

¹⁹⁰ Lauren S. B. Bornemann, *This is Ground Control to Major Tom . . . Your Wife Would Like to Sue But There’s Nothing We Can Do . . . The Unlikelihood that the FTCA Waives Sovereign Immunity for Torts Committed by United States Employees in Outer Space: A Call for Preemptive Legislation*, 63 J. AIR L. & COM. 517, 531-32 (1998).

¹⁹¹ KLEINMAN ET AL., *supra* note 2, at 105-06.

¹⁹² Bornemann, *supra* note 190, at 531.

liable up to its maximum probable loss, a case-by-case determination “capped at \$500 million in 1988 dollars [that is] adjusted for inflation.”¹⁹³ Compensation in excess of the maximum probable loss is governed by the second tier, which is paid through a public fund maintained by the federal government.¹⁹⁴ Under the third tier, once liability exceeds \$2 billion in 1988 dollars, the private actor is again responsible for payment.¹⁹⁵ In doing so, Congress effectively protects private actors from unlimited liability via its allocation of up to \$1.5 billion toward damages.¹⁹⁶

This addresses one of the chief criticisms of the Liability Convention—the lack of a cap on compensation—although the State is still subject to unlimited liability.¹⁹⁷ By agreeing to the creation of the second tier of repayment, however, “[t]he United States has . . . committed itself to pay for negligence claims to which it was not even a party.”¹⁹⁸ This practice comports with the victim-oriented view of space law originally espoused by the Liability Convention, and represents a tacit agreement to its ideals by the United States Congress while still promoting private development. Indeed, “[i]n the interconnected world of the twenty-first century, the ‘one-nation-go-it-alone’ model . . . is becoming increasingly anachronistic.”¹⁹⁹

2. Commercial Space Launch Amendments Act of 2004 (CSLAA)²⁰⁰

Congress’s passage of the Commercial Space Launch Amendments Act of 2004²⁰¹ signaled to aerospace companies that the federal government supported the efforts of the private sector to carry passengers into space.²⁰² Specifically, the CSLAA

¹⁹³ KLEINMAN ET AL., *supra* note 2, at 105.

¹⁹⁴ *Id.* at 106.

¹⁹⁵ *Id.*

¹⁹⁶ *Id.*

¹⁹⁷ See KAYSER, *supra* note 9, at 51.

¹⁹⁸ Bornemann, *supra* note 190, at 532.

¹⁹⁹ Joanne Irene Gabrynowicz, *One Half Century and Counting: The Evolution of U.S. National Space Law and Three Long-Term Emerging Issues*, 4 HARV. L. & POL’Y REV. 405, 426 (2010).

²⁰⁰ Commercial Space Launch Amendments Act of 2004, Pub. L. No. 108-492, 118 Stat. 3974 (2004) (codified at 51 U.S.C. §§ 70101-21 (2011)).

²⁰¹ *Id.*

²⁰² See *National Space Policy of the United States of America* (June 28, 2010), available at http://www.whitehouse.gov/sites/default/files/national_space_policy_6-28-10.pdf (recognizing that “a robust and competitive commercial space sector is vital The United States is committed to encouraging and facilitating the growth of a U.S. commercial space sector.”).

“authorized private individuals to pay for, and commercial space entities to provide, space travel.”²⁰³

The CSLAA imposes only minimal requirements on space flight participants,²⁰⁴ the most important of which, arguably, is that they give “written informed consent.”²⁰⁵ The CSLAA’s requirement for informed consent is a logical extension of the Launch Act’s licensing scheme in that both operate as preventative measures that attempt to improve safety.²⁰⁶ Because of the multitude of risks associated with space travel,²⁰⁷ it is reasonable to assume that the required waivers will be exceedingly comprehensive and cautiously drafted to avoid liability.²⁰⁸ Indeed, some spaceflight operators will go to extreme lengths to demonstrate the validity of waivers. For example, Space Adventures, the “first and only company”²⁰⁹ to have sent non-astronauts into space, explicitly includes a “waiver signing ceremony” in its default suborbital spaceflight itinerary.²¹⁰

3. The U.S. Congress’s Failure to Act

The Launch Act and CSLAA continue where the Outer Space Treaty and the Liability Convention leave off by addressing unresolved issues in commercial spaceflight and liability. Additionally, Congress crafted legislation that maintains the spirit of those two treaties by providing for a fund that supplements the insurance requirements while simultaneously

²⁰³ KLEINMAN ET AL., *supra* note 2, at 80.

²⁰⁴ *See id.* at 95-97.

²⁰⁵ 51 U.S.C. § 70102(c)(13)(c). Though not explicitly regulated by statute, an area of increasing relevance is whether the FAA’s hands-off approach regarding passenger fitness to fly is adequate, because the current rules leave the “medical screening process up to the commercial space vehicle operators.” Julielynn Wong, *Doc, Am I Fit to Fly Into Space?*, FORBES (Jan. 10, 2013), <http://www.forbes.com/sites/singularity/2013/01/10/doc-am-i-fit-to-fly-into-space/>.

²⁰⁶ 51 U.S.C. § 70102(a)(12)-(15)

²⁰⁷ *See supra* notes 15-17 and accompanying text.

²⁰⁸ *See, e.g.*, Pamela L. Meredith & Marshall M. Lammers, *Commercial Spaceflight: The “Ticket to Ride”*, 25 No.1 AIR & SPACE LAW. 4 & n.56 (2012) (citing N.M. Laws 8, § 4 as a sample exculpatory clause: “WARNING AND ACKNOWLEDGMENT: I understand and acknowledge that under New Mexico law, there is no liability for injury to or death sustained by a participant in a space flight activity provided by a space flight entity if the injury or death results from the inherent risks of the space flight activity . . .”).

²⁰⁹ *About Us*, SPACE ADVENTURES, http://www.spaceadventures.com/index.cfm?fuseaction=about_us.welcome (last visited Aug. 19, 2013).

²¹⁰ *Suborbital Spaceflight Sample Itinerary*, SPACE ADVENTURES, http://www.spaceadventures.com/index.cfm?fuseaction=suborbital.Spaceflight_Itinerary (last visited Aug. 19, 2013).

addressing unlimited liability for private actors.²¹¹ But in failing to specifically address liability for amounts less than \$500 million and more than \$2 billion in the CSLAA, Congress has ceded the issue to the states.²¹² This inaction, when combined with the various states' limited liability statutes,²¹³ represents a symbolic derogation of the United States' preexisting obligation under the Liability Convention to allow for victims to recover from harm.²¹⁴

D. State Limited Liability Statutes Are Contrary to the Victim-Oriented Regime

Because spaceflight operators are still liable for an amount up to the maximum probable loss, states have passed limited liability statutes completely absolving spaceflight operators from liability, in a race to the bottom.²¹⁵ As a supplement to the federal requirement for waivers, several states have passed laws limiting the liability of companies offering human spaceflight services.²¹⁶ Fittingly, those states—Virginia,²¹⁷ Florida,²¹⁸ New Mexico,²¹⁹ Texas,²²⁰ and California²²¹ (collectively, the “space states”)—also tend to have privately funded and operated spaceports.²²² Additionally, businesses have proposed to build spaceports in Alabama, Washington, Hawaii, Wisconsin, Wyoming, Indiana, and multiple locations in Texas,²²³ all of which are the headquarters, states of incorporation, or anticipated expansion sites of the major private spaceflight companies.²²⁴ The motivation is clear: companies with existing space operations want limited liability

²¹¹ See 51 U.S.C. §§ 50901-50923 (2011).

²¹² *Id.* § 70112.

²¹³ See *infra* Part I.C.

²¹⁴ See BENDER, *supra* note 30, at 313.

²¹⁵ KLEINMAN ET AL., *supra* note 2, at 107-13.

²¹⁶ *Id.* at 109-10.

²¹⁷ VA CODE ANN. §§ 8.01-227.8-.10 (2007).

²¹⁸ FLA. STAT. § 331.501 (2012).

²¹⁹ N.M. STAT. ANN., § 58-31-1 to -17 (West 2013).

²²⁰ TEX. LOC. GOV'T CODE ANN. § 507.103 (West 2013).

²²¹ CAL. GOV'T CODE § 13999.3 (West 2013).

²²² KLEINMAN ET AL., *supra* note 2, at 108-09. Currently Alaska and Oklahoma have spaceports but have not passed limited liability laws. Weichman, *supra* note 58, at 7-10; Thomas Brannen, Comment, *Private Commercial Space Transportation's Dependence on Space Tourism and NASA's Responsibility to Both*, 75 J. AIR L. & COM. 639, 656-59 (2010).

²²³ KLEINMAN ET AL., *supra* note 2, at 108 (2012).

²²⁴ *Id.*

protection.²²⁵ States rightly believe that they can attract private operators by passing limited liability laws.²²⁶

In broadly analyzing the five state statutes, it is apparent that they share many similarities with only minor differences.²²⁷ Each state specifies the necessary language that a waiver must contain to limit a spaceflight operator's liability, as per the CLSAA's requirement.²²⁸ And while the statutes all limit liability, none of them exempt gross negligence or intentional torts.²²⁹ In fact, Florida, New Mexico, and California also include carve-outs for when the operator had "actual knowledge" or "should have known" of the danger.²³⁰

As a result of most states not having limited liability laws, choice of law issues will likely apply in the event of a spaceflight accident.²³¹ Nevertheless, a majority of jurisdictions in the United States generally enforce exculpatory clauses.²³² Therefore, even if a plaintiff can win on the choice of law issue, and convince a court to apply the law of a jurisdiction other than the state of contract formation, the plaintiff may still lose on the merits.²³³ This is because courts will likely treat the spaceflight industry more like expeditions to Mount Everest or

²²⁵ See Meredith & Lammers, *supra* note 208, at 4. Even where a state already has a limited liability statute, commercial spaceflight companies have pushed for even greater limits on suits. Irene Klotz, *Virgin Galactic Pushing for New Mexico Liability Relief*, SPACE NEWS, Nov. 21, 2012, <http://www.spacenews.com/article/launch-report/32476virgin-galactic-pushing-for-new-mexico-liability-relief>.

²²⁶ KLEINMAN ET AL., *supra* note 2, at 108. See Edward Helmore, *Virgin Threatens to Pull out of Projected Spaceport*, GUARDIAN (Jan. 12, 2013), <http://www.guardian.co.uk/science/2013/jan/13/branson-virgin-space-tourism-threat> ("A spokeswoman for Virgin Galactic said: 'Without the legislation in place, [the state] will be perceived as a place that is less friendly to space business'"); Mark Whittington, *New Mexico Space Tourism Dependent on Passage of "Informed Consent" Bill*, EXAMINER.COM (Jan. 4, 2013), <http://www.examiner.com/article/new-mexico-space-tourism-dependent-on-passage-of-informed-consent-bill> ("A group of trial lawyers succeeded in watering down [limited liability] legislation in California, which some suggest led to XCOR moving some of its operations to Midland, Texas [which confers greater protections to spaceflight companies].").

²²⁷ KLEINMAN ET AL., *supra* note 2, at 110.

²²⁸ *Id.*; see, e.g., Meredith & Lammers *supra* note 208.

²²⁹ KLEINMAN ET AL., *supra* note 2, at 110.

²³⁰ FLA. STAT. § 331.501 (2012); S.B. 9, 49th Leg., Reg. Sess. (N.M. 2010); Assemb. B. 2243, Ch. 416 (Cal. 2012); Meredith & Lammers, *supra* note 208, at 6-7.

²³¹ See Meredith & Lammers, *supra* note 208, at 6-7.

²³² See, e.g., *Appalachian Ins. Co. v. McDonnell Douglas Corp.*, 214 Cal. App. 3d 1 (Ct. App. 1989) (rejecting argument that exculpatory clause was neither unconscionable nor unenforceable in a case involving the failure of a telecommunications satellite to reach its desired orbit).

²³³ See Meredith & Lammers, *supra* note 208, at 6-7.

Antarctica and less like the commercial airline industry, and bar recovery against operators.²³⁴

Despite differences between the states' various limited liability statutes and enforcement, their very existence goes against the principles and ideals set forth in the Liability Convention and Launch Act.²³⁵ As a general matter, the state laws bar a plaintiff from recovery once they have been informed of the risk and consented to be a spaceflight participant.²³⁶ A provision of that sort is absent from the Liability Convention, which recognizes only strict and common-law fault liability.²³⁷ Even when the Convention refuses to grant "privileged victim" status on the theory that a party has assumed the risk of spaceflight, fault liability, at a minimum, still applies.²³⁸ The space states, in their attempt to promote business development, have acted against the shared international ideals that the United States, via Congress, agreed to.²³⁹

II. FEDERAL PREEMPTION AS A MEANS TO COMPENSATE VICTIMS AND FOCUS INDUSTRY GROWTH

The current system of international, federal, and state law should ideally operate to promote two goals. First, the international and United States systems of space law should ensure that victims of spaceflight accidents are properly compensated for the damages they suffer.²⁴⁰ Second, the U.S. federal and state systems of space law should encourage the growth of commercial spaceflight operations.²⁴¹

On its face, victim compensation and business growth seem to be not only incompatible goals, but polar opposites. Indeed, if the short-term economic gains that are to be achieved through space tourism are the goal, then that assessment is likely correct. Current space tourism, which only consists of

²³⁴ See *id.* But cf. Rob Coppinger, *Space Tourism: Fly at Your Own Peril*, FLIGHTGLOBAL (Apr. 11, 2009), <http://www.flightglobal.com/news/articles/space-tourism-fly-at-your-own-peril-324978> (quoting Virgin Galactic president Will Whitehorns's opinion on this issue: "Informed consent has worked quite well in scuba diving, but in other industries it hasn't. You still have to build your business on the basis [that] those protections don't exist because you're talking about people's lives. That is the commercial aviation background coming to the fore.") (alteration in original).

²³⁵ See *supra* Part I.B.2 and Part I.C.1.

²³⁶ KLEINMAN ET AL., *supra* note 2, at 108.

²³⁷ Liability Convention, *supra* note 34, art. II, IV.

²³⁸ *Id.*

²³⁹ See KLEINMAN ET AL., *supra* note 2, at 107.

²⁴⁰ See *supra* Part I.B.2 and Part I.C.1.

²⁴¹ See *supra* Part I.B–C.

sending customers on a short two-hour trip to the lower fringes of outer space with a return to the original launch site,²⁴² benefits from laws that limit liability.²⁴³ Those flights are more akin to extreme sports,²⁴⁴ which are generally immune from lawsuits when participants sign waivers.²⁴⁵ Moreover, it is inarguable that those individual companies have an interest in limiting their financial liability if at all possible.

But focusing so closely on crafting a legislative regime that supports only this type of space tourism specifically, and not commercial spaceflight generally,²⁴⁶ is a gamble. By allowing for limited liability, the United States risks being burdened with an inflexible statutory structure that may no longer support the originally intended business model. If space tourism is the only prospective use of the technologies being developed, then it is perhaps conceivable to maintain the limited liability system. That is not the case, however. To wit, emerging technologies, including point-to-point transport, hotels in outer space, and long-distance voyages, are currently under development, all of which envision different goals and require different governmental intervention.²⁴⁷ In fact, analysts speculate that they may “eventually even supplant” the space tourism market.²⁴⁸ In this scenario, because those activities also

²⁴² A more complete definition of space tourism would encompass both the above-mentioned sub-orbital space tourism, but also orbital space tourism. von der Dunk, *supra* note 2, at 403-08. Examples of orbital space tourism include visits to the International Space Station by private citizens Dennis Tito in 2001, Mark Shuttleworth in 2002, Greg Olsen in 2005, Anousheh Ansari in 2006, and Charles Simonyi in 2007. *Id.* at 404.

²⁴³ See, e.g., Jeri Clausing, *Spaceport Wants Protections from Tourist Lawsuits*, ASSOCIATED PRESS BIG STORY (Jan. 7, 2013), <http://bigstory.ap.org/article/spaceport-wants-protections-tourist-lawsuits>.

²⁴⁴ Lisa Grossman, *California Space Law Boosts Business, Not Safety*, NEWS SCIENTIST (Sept. 27, 2012), <http://www.newscientist.com/article/dn22303-california-space-law-boosts-business-not-safety.html> (“The . . . law treats spaceflight rather like sky-diving, requiring future [travelers] to give ‘informed consent.’ They agree not to sue the company they fly with if they’re injured or killed in the process.”). Guy Laliberte “the built-like-a-wrestler founder of Cirque du Soleil” described his twelve-day stay on the International Space Station as exacting a “[considerable] physical toll.” Hannah Elliott, *Space-Traveling Cirque Du Soleil Founder On Elon Musk: He Did the First Step for Galactic Tourism*, FORBES (Dec. 12, 2012), <http://www.forbes.com/sites/hannahelliott/2012/12/12/space-traveling-cirque-du-soleil-founder-on-elon-musk-he-did-the-first-step-for-galactic-tourism>.

²⁴⁵ See *supra* Part I.D.

²⁴⁶ This would also include point-to-point spaceflight, hotels in orbit and in space, and trips to the moon. See von der Dunk, *supra* note 2, at 407-11.

²⁴⁷ *Id.*

²⁴⁸ S. SUZETTE BEARD & JANICE STARZYK, FUTRON SPACE TOURISM MARKET STUDY: ORBITAL SPACE TRAVEL & DESTINATIONS WITH SUBORBITAL SPACE TRAVEL 66 (Oct. 2002), available at http://www.futron.com/upload/wysiwyg/Resources/Reports/Space_Tourism_Market_Study_2002.pdf.

encompass the universe of private commercial spaceflight, it may be necessary to dismantle the limited liability model and attempt to impose an alternative that better reflects the direction of the industry.²⁴⁹ Imposing a system of law so focused on just one facet of the industry, and potentially at the expense of the others, is ill-advised.

Regardless which of these emerging technologies develops first, the industry must prioritize safety in order to achieve marketplace success.²⁵⁰ As then-Virgin Galactic President Will Whitehorn explained, his company's goal with its space tourism business is to first establish a safety record of no more than one accident per 50,000 flights, which would represent a statistic on par with the commercial airline industry.²⁵¹ After accomplishing that goal, Virgin can then transition to offering point-to-point flights,²⁵² presumably because they view it as a profitable enterprise.²⁵³ Additionally, this system of flights could find acceptance in the cargo transport industry and by the U.S. military,²⁵⁴ markets that space tourism cannot fill. At Virgin's current expected rate of progress, however, it will take decades to log the number of flights necessary to institute an ideal safety record.²⁵⁵

Accordingly, space tourism companies should increase the amount of flights they offer to more quickly reach the goal of offering point to point flights. Beyond demonstrating safety, they must simultaneously dispel the perception that their product is reserved for the wealthy, and build mass market appeal. However, making more flights available is counter-productive if there are not enough people to fill the seats. As it stands, market research shows that today's dominant potential customer base is predominantly male, in his mid-fifties, and wealthy.²⁵⁶ But if ticket prices decrease, more people will be

²⁴⁹ Grossman, *supra* note 244 (quoting Professor Matthew Schaefer: "Once we get to 1000 flights a day for point-to-point suborbital travel, New York to Tokyo in an hour and a half . . . , then you may need a different regulatory structure[.]").

²⁵⁰ "[F]light vehicles must operate safely, reliably, and affordably in order to sustain and grow their target markets." GETTING FASTER: A CASE FOR HIGH-SPEED GLOBAL POINT-TO-POINT FLIGHT AS A LOGICAL TRANSITION BETWEEN SUBORBITAL SPACE TOURISM AND LOW-COST, REUSABLE SPACE ACCESS, FASTFORWARD STUDY GROUP 6 (Oct. 2009), available at http://www.sei.aero/eng/papers/uploads/archive/FF_Getting_Faster_Oct2009.pdf.

²⁵¹ von der Dunk, *supra* note 2, at 407-08.

²⁵² *Id.* at 408.

²⁵³ See BEARD & STARZYK, *supra* note 248, at 66.

²⁵⁴ Jeff Foust, *First Steps Towards Point-to-Point Spaceflight*, THE SPACE REVIEW.COM (Feb. 23, 2009), <http://www.thespacereview.com/article/1311/1>.

²⁵⁵ von der Dunk, *supra* note 2, at 408.

²⁵⁶ See BEARD & STARZYK, *supra* note 248, at 1-2.

increasingly willing to travel, thereby expanding the market.²⁵⁷ Although it seems counterintuitive, for spaceflight to reach that wider audience, the industry must reduce prices, shed its playboy status, and become boring, mundane, and safe.²⁵⁸

State limited liability statutes may therefore be more acceptable if the only issue was promoting space tourism at the expense of properly informed and consenting participants. Advocates of that position would still need to justify circumventing the United States' international obligations under the ideals of the Outer Space Treaty and the Liability Convention, but the position may nevertheless be defensible in the interest of economic development. However, the space states are focused on crafting a narrow response to a singular issue—space tourism—whereas there exists an entire commercial spaceflight industry that encompasses several different, but related sectors. That means those limited liability statutes may have the actual effect of hurting the industry. By taking away a potential plaintiff's ability to bring suit, the states are foreclosing a class of customers, the risk-averse, to the spaceflight industry. This also necessarily lessens a company's ability to create a track record of safety, thereby slowing the path to the potentially more profitable mass market,²⁵⁹ and a more diversified private commercial spaceflight business. Because the states' limited liability statutes arguably impact both victims and the spaceflight companies negatively, Congress should enact national standards that disallow their existence.

Because the space states are all self-interested in attracting businesses, it is unrealistic to expect that they will unilaterally repeal their limited liability statutes,²⁶⁰ particularly because some of those businesses are arguably committed solely to remaining space tourism companies.²⁶¹ In this sense, the states and those companies are similar in that they are willing to benefit at the expense of an overarching goal. The states wish to enrich themselves in favor of national and international goals, and the dedicated space tourism companies wish to enrich themselves in favor of the continued healthy

²⁵⁷ *Id.* at 20-21.

²⁵⁸ See ADEBOLA ET AL., *supra* note 8, at 36-37, 77.

²⁵⁹ See BEARD & STARZYK, *supra* note 248, at 52, 59.

²⁶⁰ See, e.g., Grossman, *supra* note 244; Whittington, *supra* note 213.

²⁶¹ To the author's knowledge, of the major space tourism companies, Virgin Galactic is the only company that has discussed plans of point-to-point transport. See von der Dunk, *supra* note 2, at 407-08.

growth of the industry at large. Accordingly, federal preemption is the most sensible solution in that it has the ability to be sufficiently far-seeing to ignore those short-term interests.

Regardless of the plan that Congress adopts, it must, at a minimum, modify or eliminate the limited liability spaceflight statutes as they currently exist in the space states. As a starting point, Congress may consider amending the Launch Act's three tier recovery system by lowering the first tier damage cap of \$500 million to an amount that would adequately compensate a victim, but would not bankrupt a spaceflight company. As a supplement to that, Congress could create an "obligatory insurance regime, or [a national] compensation fund" supported by fees collected from private parties.²⁶²

Even if Congress does not accept the premise that eliminating limited liability is in the country's best interests, a uniform national law would provide certainty for commercial spaceflight companies. As the commercial spaceflight industry continues to develop and mature, the necessity of implementing changes to the current legislative regime will only grow. If the United States is to remain the leader in outer space activities, Congress must act sooner, rather than later.

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²⁶² See HURWITZ, *supra* note 75, at 57-58.

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